Abstract of the Disclosure

The invention relates to a spatially encoded polymer matrix in the form of a bead or a granule for combinatorial solid phase synthesis, assaying, functional proteomics and diagnostic use. Compositions of such beads or granules are also provided. Each beaded polymer matrix of the composition comprises a plurality of spatially immobilised particles. The spatial immobilisation of the particles confers on each beaded polymer matrix a "fingerprint" which enables identification of unique beads in a population of beads. The unique identification of individual beads makes it possible to perform combinatorial chemistry strategies while logging individual chemical transformation. Also provided are methods for detection of relative positions in space of particles, methods for generating matrices, methods for distance matrix determination, methods for identifying individual matrices and devices for recording and storing images of matrices.

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(54) Title: SPATIALLY ENCODED POLYMER MATRIX

Spatial encoding of beads

Y1,Z1; Y2,Z2; Y3,Z3
X1,Z1; X2,Z2; X3,Z3   →
X1,Y1; X2,Y2; X3,Y3

X1, Y1, Z1
X2, Y2, Z2   →
X3, Y3, Z3

$V_1 = (V1X, V1Y, V1Z) = X1-X2, Y1-Y2, Z1-Z2$
$V_2 = (V2X, V2Y, V2Z) = X1-X3, Y1-Y3, Z1-Z3$
$V_3 = (V2X, V2Y, V2Z) = X2-X3, Y2-Y3, Z2-Z3$

CCD's

Scanning
Lasers and PMT

X

Z

$D_1 = (V1X^2 + V1Y^2 + V1Z^2)^{1/2}$
$D_2 = (V2X^2 + V2Y^2 + V2Z^2)^{1/2}$
$D_3 = (V3X^2 + V3Y^2 + V3Z^2)^{1/2}$

Y   PMT
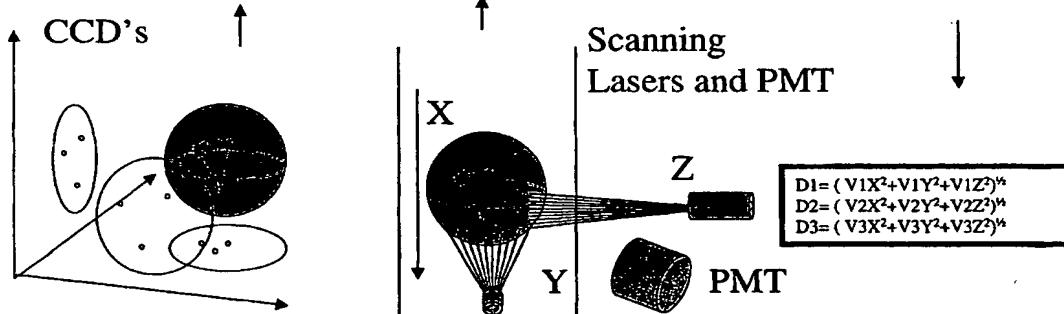
(57) **Abstract:** The invention relates to a spatially encoded polymer matrix in the form of a bead or a granule for combinatorial solid phase synthesis, assaying, functional proteomics and diagnostic use. Compositions of such beads or granules are also provided. Each beaded polymer matrix of the composition comprises a plurality of spatially immobilised particles. The spatial immobilisation of the particles confers on each beaded polymer matrix a "fingerprint" which enables identification of unique beads in a population of beads. The unique identification of individual beads makes it possible to perform combinatorial chemistry strategies while logging individual chemical transformation. Also provided are methods for detection of relative positions in space of particles, methods for generating matrices, methods for distance matrix determination, methods for identifying individual matrices and devices for recording and storing images of matrices.

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